T L Audio

INDIGO SERIES

User Manual

PA-2001 VALVE PRE-AMPLIFIER

Tony Larking Professional Sales Limited,

Letchworth, England.

interstage
Phistersvej 31, 2900 Hellerup, Danmark
Telefon 3946 0000, fax 3946 0040
www.interstage.dk
- pro audio with a smile

INTRODUCTION

The T L Audio Indigo Series combines classic valve techniques with low noise solid state circuitry to produce audio processing units offering very high quality signal paths with comprehensive control facilities and the unique valve sound.

The PA-2001 is a four channel valve microphone pre-amplifier. Featuring very low noise and an exceptionally wide bandwidth, it provides continuously variable input and output gain controls, high pass filter and phase reverse switches, and independently switched +48V phantom power.

The block diagram of one channel of the unit is shown in fig.1. The microphone input socket is a balanced XLR connector, with phantom power applied via a front panel switch. The gain of the input stages is controlled by a continuously variable rotary control providing between 10 and 60dB of gain. A switchable 12dB per octave high pass filter is provided to reduce unwanted background low frequency noise, such as traffic rumble or wind effects.

The second stage of the pre-amplifier consists of both sections of a twin triode valve (vacuum tube), which has a variable signal level depending on the setting of the input gain control. Thus the characteristic valve sound may be subtlety introduced or used to effect by turning up the input gain. A variable intensity peak LED monitors the output of the triode circuit to indicate the headroom available. The LED will begin to glow when a signal 6dB above normal line up level is present, and will be fully illuminated when there is 10 dB of headroom remaining.

Phase reverse may be applied, prior to the output level control which allows matching to the sensitivity of the following equipment (e.g. mixing console or tape machine). The combination of input and output gain controls allows optimisation of the operating level in the valve stages, to produce a clean uncoloured sound through to a signal with a degree of valve warmth added.

Each channel has a balanced line level output on an XLR socket at a nominal level of +4dBu, and an unbalanced output on a jack socket at a nominal level of -10dBu.

Please read this manual fully before installing or operating the Pre-Amplifier.

PRECAUTIONS

The T L Audio PA-2001 Pre-Amplifier requires very little installation, but like all electrical equipment, care must be taken to ensure reliable, safe operation. The following points should always be observed:

- All mains wiring should be installed and checked by a qualified electrician,

- Ensure the correct operating voltage is selected on the rear panel before connecting to the mains supply,

- Never operate the unit with any cover removed,

- Do not expose to rain or moisture, as this may present an electric shock hazard,

- Replace the fuse with the correct type and rating only.

Warning: This equipment must be earthed.

INSTALLATION

AC Mains Supply.

The unit is fitted with an internationally approved 3 pin IEC connector. A mating socket with power cord is provided with the unit, wired as follows:

Brown: Live.

Blue: Neutral.

Green/Yellow: Earth (Ground).

All mains wiring should be performed by a qualified electrician with all power switched off, and the earth connection must be used.

Before connecting the unit to the supply, check that the voltage selector switch on the rear panel is correctly set. The unit may be set for 115V (accepting voltages in the range 110V to 120V, 60Hz AC), or to 230V (for voltages in the range 220V to 240V, 50Hz AC). Adjustment to the operating voltage should be made by sliding the selector switch left or right with a small screwdriver until the desired voltage is displayed. The mains fuse required is 20mm anti-surge, 1AT rated at 250V. If it ever necessary to replace the fuse, only the same type and rating must be used. The power consumption of the equipment is 30VA.

Warning: attempted operation on the wrong voltage setting, or with an incorrect fuse, will invalidate the warranty.

Audio Operating Level.

The pre-amplifier is equipped with outputs suitable for connection to a wide variety of other audio equipment. Generally, the balanced XLR connections will be required for interfacing to other professional equipment, where the operating level (line-up level or nominal level) will be +4dBu, or about 1.2V rms. The unbalanced jack connectors are generally intended for interfacing to semi-professional equipment and have an operating level of -10dBu, or about 225mV rms.

Both outputs of each channel may be used simultaneously if required. Balanced interconnection is always preferable to obtain the best headroom and noise rejection, but can only be used if the other equipment in the chain, e.g. the mixing console, also has provision for balanced connections.

Microphone Inputs.

Each channel has a female, 3 pin XLR connector, suitable for balanced low impedance (150 to 600 ohm) microphones. The mating connector should be wired as follows:

- Pin 1 = Ground (screen).
- Pin 2 = Signal Phase (also known as "+" or "hot").
- Pin 3 = Signal Non-Phase ("-" or "cold").

Balanced Outputs.

The output is via a balanced, 3 pin male XLR connector. The mating connector should be wired as follows:

- Pin 1 = Ground (screen),
- Pin 2 = Signal Phase ("+" or "hot"),
- Pin 3 = Signal Non-Phase ("-" or "cold").

Unbalanced Outputs.

An unbalanced line output is provided for each channel, on a 0.25" mono jack socket.

- Tip = Signal Phase ("+" or "hot").
- Screen = Ground.

Ventilation.

The unit generates a small amount of heat internally. This heat should be allowed to dissipate by convection through the grills in the side panels and top cover, which must not be obstructed. Do not locate the unit where it will be subject to external heating, for example in the hot air flow from a power amplifier, or on a radiator.

The pre-amplifier may be free standing, or mounted in a standard 19" rack.

Rear Panel.

The rear panel connectors are identified in fig.3. Make sure that all settings, mains and audio connections have been made as described above before attempting to operate the equipment.

OPERATION.

Front Panel.

The front panel controls are identified in fig.2. Each of the four sections is identical.

Phantom Power.

Phantom power may be applied to the microphone socket by depressing the +48V switch. Do not attempt to connect any microphone that does not require phantom power, or any other equipment such as a DI box, to an input socket that has phantom power switched on.

CAUTION: Never switch phantom power on or off, or plug / unplug a microphone with phantom power applied unless the output level control is turned down. Failure to do so may result in a thump in your monitor loudspeakers.

Input Gain.

The gain of the input stage is variable from +10 to +60dB. This is a very wide range, to cater for all types of microphone and recording situations, but care must be taken not to apply large, sudden changes in gain which may result in unexpectedly large output signals.

Generally, it is advisable to set the input gain such that the peak LED just begins to illuminate on the loudest expected signal. This ensures that the optimum signal to noise ratio is obtained, whilst allowing a good margin of headroom.

Peak LED.

Each channel is equipped with a red LED, which is intensity modulated to indicate the signal level in the valve stages. Reducing the input gain will result in the peak LED illuminating later. However, reducing the output level will have no affect on the peak LED, although it will, of course, reduce the output signal level.

The LED starts to illuminate with a pre-fade level (i.e. before the output level control) of +6dBu, and is fully illuminated at +16dBu. At this point there is still 10dB of headroom left, so it is quite acceptable to drive the unit such that the peak LED is illuminated brightly on loud peaks, in order to exploit the valve character of the circuitry.

90Hz Filter.

The high pass filter switch restricts the low frequency response of the pre-amplifier, to effectively remove rumble or LF noise from the signal. The filter is a second order, 12dB per octave design, with a -3dB point at 90Hz, which has been developed to remove unwanted noise and improve intelligibility without affecting vocal or bass instrument programme content.

Phase Reverse.

The phase reverse switch allows correction of a phase error, which may have occurred in microphone wiring or placement. A phase mis-match will probably manifest itself as an apparent loss of bass content when two microphone signals are mixed together or fed to a stereo pair of loudspeakers. If an error is suspected, it is a simple operation to check by phase reversing each channel in turn.

Output Level.

The output level control acts a continuously variable attenuator on the output of the channel. The output of the pre-amplifier is capable of +26dBu, which is sufficient to directly interface and fully modulate a digital multitrack for direct to tape recording. This technique is gaining in popularity as a means of recording a very high quality signal prior to mixdown, avoiding the noise and colouration added by recording through a mixing console.

In other applications, such as feeding into a console or signal processor, a much lower output level will be required. The output level control allows precise control and fading of the signal without affecting the operating level - and therefore signal quality - in the pre-amplifier.

SPECIFICATIONS

Microphone Input:

Electronically balanced.
Input impedance greater than 2Kohm.
Gain range +10dB to +60dB.
Noise -127dBu (EIN with 150 ohm source, 22Hz - 22KHz and maximum gain).
3 pin female XLR connector.

Phantom Power:

+48V at 10mA maximum per microphone.

High Pass Filter:

-3dB at 90Hz, 12dB per octave.

Balanced Outputs:

Electronically balanced, unbalanced compatible.
Output impedance 47 ohms.
Maximum level +26dBu.
3 pin male XLR connector.

Unbalanced Outputs:

Output impedance 47 ohms.
Maximum level +18dBu into 10Kohms.
2 pole 0.25" jack socket.

Frequency Response:

10Hz to 40KHz, +0, -1dB.

Dimensions:

19" rack mounting, 1U high.
483mm wide x 44mm high x 250mm deep.

Power Requirements:

Rear panel selectable for 220-240V 50Hz or 110-120V 60Hz operation.
Rear panel fuse 20mm, 1AT, 250V.
Power consumption 30VA typical.
Detachable 3 pin IEC connector, mating connector and cable supplied.
Front panel On/Off switch with green LED.

Weight: 4Kg.

The above specifications are subject to change without notice.

SERVICE

Should the pre-amplifier require service, it must be taken or posted to an authorised dealer. Please retain the original packing for possible future use, and ensure the unit is suitably protected during transit. The manufacturer cannot accept responsibility for damage caused during transportation.

The pre-amplifier is supported by a limited warranty for a period of one year from the date of purchase. During this period, any faults due to defective materials or workmanship will be repaired free of charge. The warranty excludes damage caused by deliberate or accidental misuse, operation on the incorrect mains voltage, or without the correct type and value of fuse fitted. It is the user's responsibility to ensure fitness for purpose in any particular application. The warranty is limited to the original purchase price of the equipment, and excludes any consequential damage or loss.

Please retain proof of purchase, and record the following details:

Serial Number.....

Date purchased.....

Dealer.....

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